KARL: a Victim of the Missing Innovation Culture in Europe

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EDA (Electronic design Automation) massively stimulates the growth of the entire economy (fig. 1, with data from 1997 [1,2]). Hardware Description Languages (HDL) are very important for the efficiency of EDA. During the 80ies when a massive commercial break-through of HDLs did not yet happen, KARL has been the most successful language at the time with 93 site licenses worldwide [3] and has been, together with its interactive graphic interface language ABL [4], the backbone of he first complete microelectronics EDA framework worldwide [5] (fig. 2 [5]). KARL has been interfaced to a lot of other software [7, 8], created a lot of literature [9, 10] and has a good quotation index [11]. We offered a lot of support to our users outlined by material about its subsystem implementations [12] and organized user group meetings [13, 14]. Within the projects CVT [15] (involved industry: British Telecom, Daimler-Benz, Italtel, MATRA-HMS, Thomson) and CVS [16] (involved AEG-Telefunken, ALCATEL, DECNET, Honeywell-Bull, Italtel, Olivetti, SEL, SGS, Thomson) this effort has been massively funded by the ESPRIT program of the European Union.
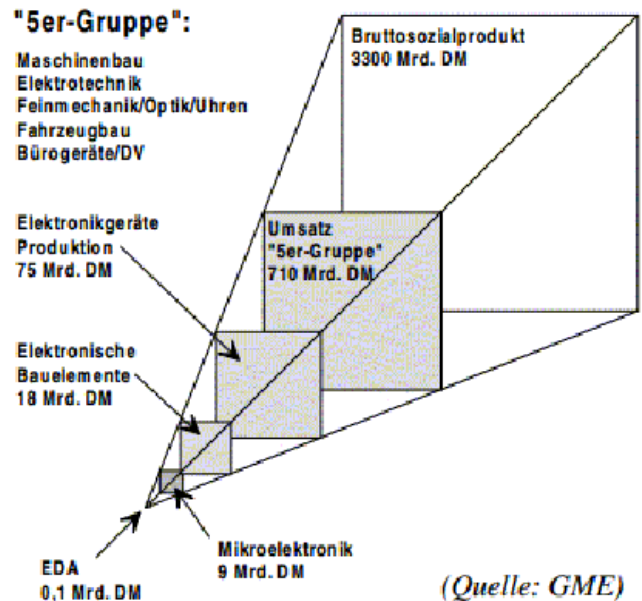

Fig. 1; How EDA industry stimulates other areas.

However, it is typic for the (missing) European innovation culture that as soon as an innovative area is becoming a trend, unerringly at that time research funding is finished (also see fig. 3 [1]). The EDA industry, the powerful key to massive economic growth (compare fig. 1), disappeared from Europe (fig. 6 [25]). This EU innovation phobic syndrome also destroyed the success story of KARL. In a meeting at the 13th ESPRIT CAVE Workshop, May 1989, Nice, France, officers from the commission of the European Union decided, after having spent for CVT and CVS more than 85 million ECU ($\approx$ €), to stop funding of research on hardware description languages: "since now there is standard: VHDL". However, in 1989 there was only a preliminary draft paper published dealing with partial implementation [6]. The standardization had only been proposed by a heavily DoD-supported aggressive VHDL lobby.
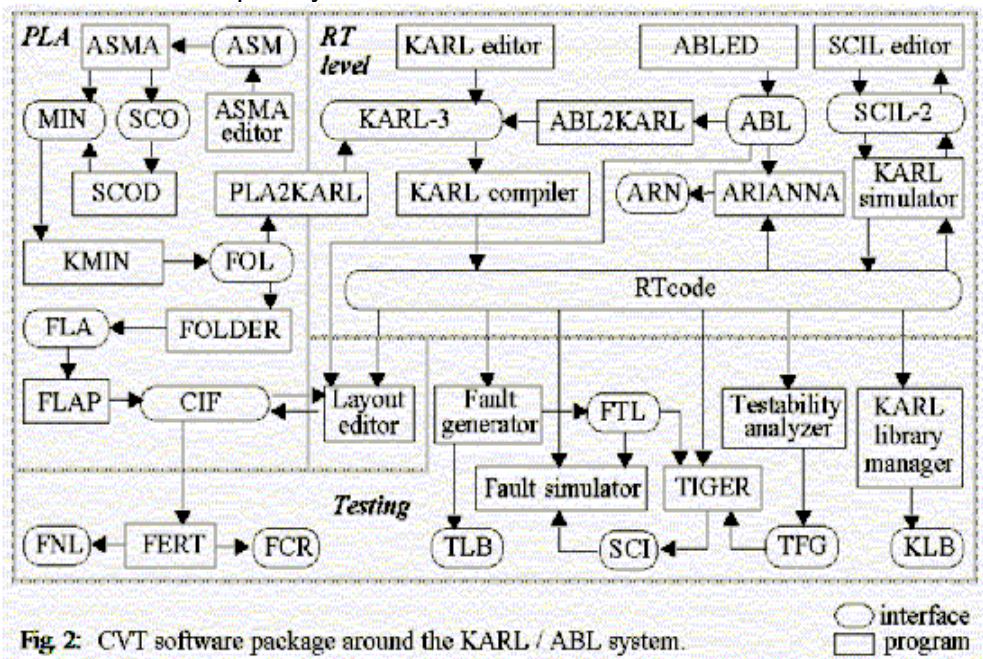

Fig. 2: CVT software package around the KARL / ABL system.

Organized by IFIP working group 10.2, or, 10.5, respectively, a successful conference series rather effectively covered research and application on all kinds of hardware description languages: "Computer Hardware Description Languages and their Applications (CHDL) [22]. The variety of languages described visible also here has been commented by Richard Newton as the "language of the year" effect (fig. 4). Here Richard Newton asked, what will be the next language after VHDL, as indicated by the question marks at the

Fig. 3; ESPRIT funding of EDA (Electronic Design Automation)

rightmost curve. After CHDL'97 [23] the CHDL series died. The IFIP working group had assigned the organization of the next CHDL to colleagues in the US. However The minutes of an IFIP WG meeting tell us that "several members of the IFIP WG indicated that although CHDL'99 and VLSI'99 are scheduled to be held in the US, there are currently no volunteers who have stepped forward to organize these events in the US" [24]. Killing the CHDL conference series removed the platform for the next "language of the year" (fig. 5). Now all future competitors of VHDL lost a very important platform. Prof. Graham Hellestrand from the University of new South Wales failed in proposing to organize CHDL-2001 in Sydney, Australia. The IFIP WG did not accept this proposal [24]. Why?
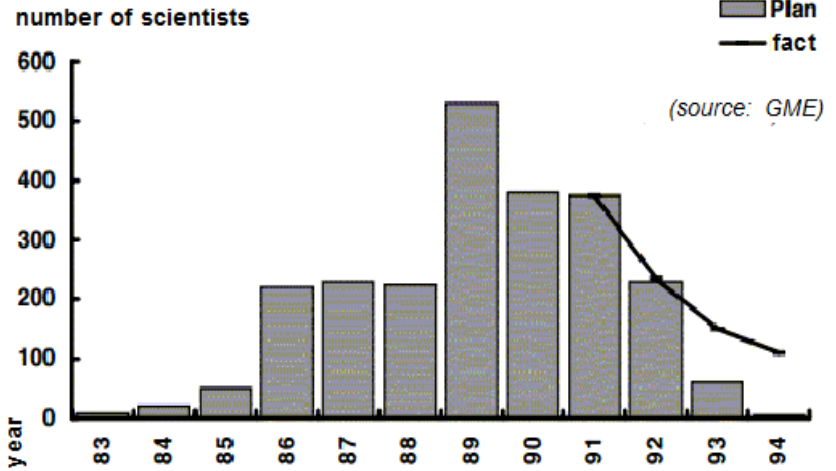
VHDL was criticized a lot by several VIPs. For instance, Jo Costello, at that time CEO of the EDA giant CADENCE, said in a keynote, that the introduction of VHDL has caused damage by several hundreds of millions of Dollars to industry. Also in a keynote Richard Newton called VHDL „the nroff of EDA". (a very inconvenient historic old word processing language, used a long time before graphical user interfaces came up.) In contrast to KARL, VHDL is not calculus-capable and its abstraction levels do not reach down to floorplan layout level. There are indications, that a

Fig. 4.

very weak FPGA programmer productivity is caused by VHDL use. Maybe the real funding shut down motivation has been, that the EU commission officers have been afraid since VHDL was going to be massively pushed by the DoD in the USA. At least in the EDA scene it seemed to be a typical European behavior, to throw away the tools, as soon as competition shows up (fig. 3 [3]). Meanwhile the EDA industry is completely located in the USA, and Europe just provides some of its users.
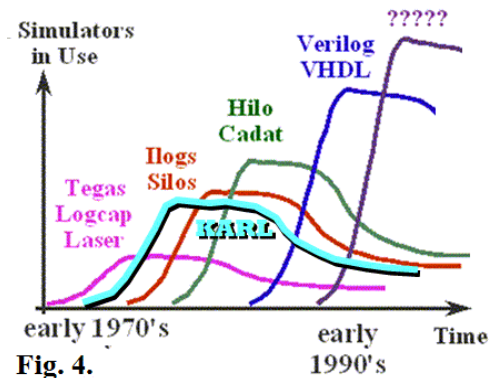
A few years ago the commission of the European Union started again looking at innovation [17]. Not only in Europe, but also worldwide we urgently need an efficient innovation culture to avoid the breakdown of our massively computer-controlled world. Because of the von Neumann syndrome [18, 19] the electricity bill to run all these computers may become unaffordable, maybe, already within a decade. The 25 year old technology to reduce the energy needed for computing by several orders of magnitude is available. However, a huge effort will be required to implement it almost everywhere. We have to reinvent computing [20]. A deep going challenge has to be mastered, so that a widely spread innovation awareness has to be present via support by the mass media (see [21], sorry, in German language).
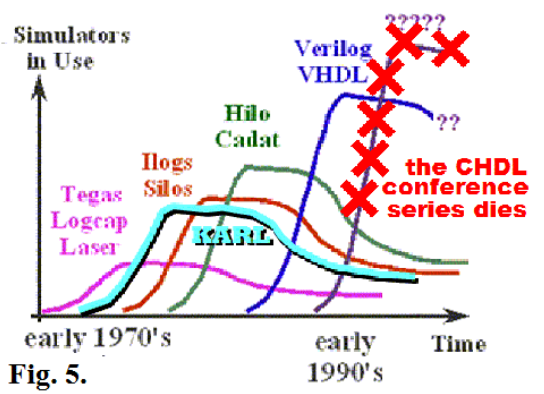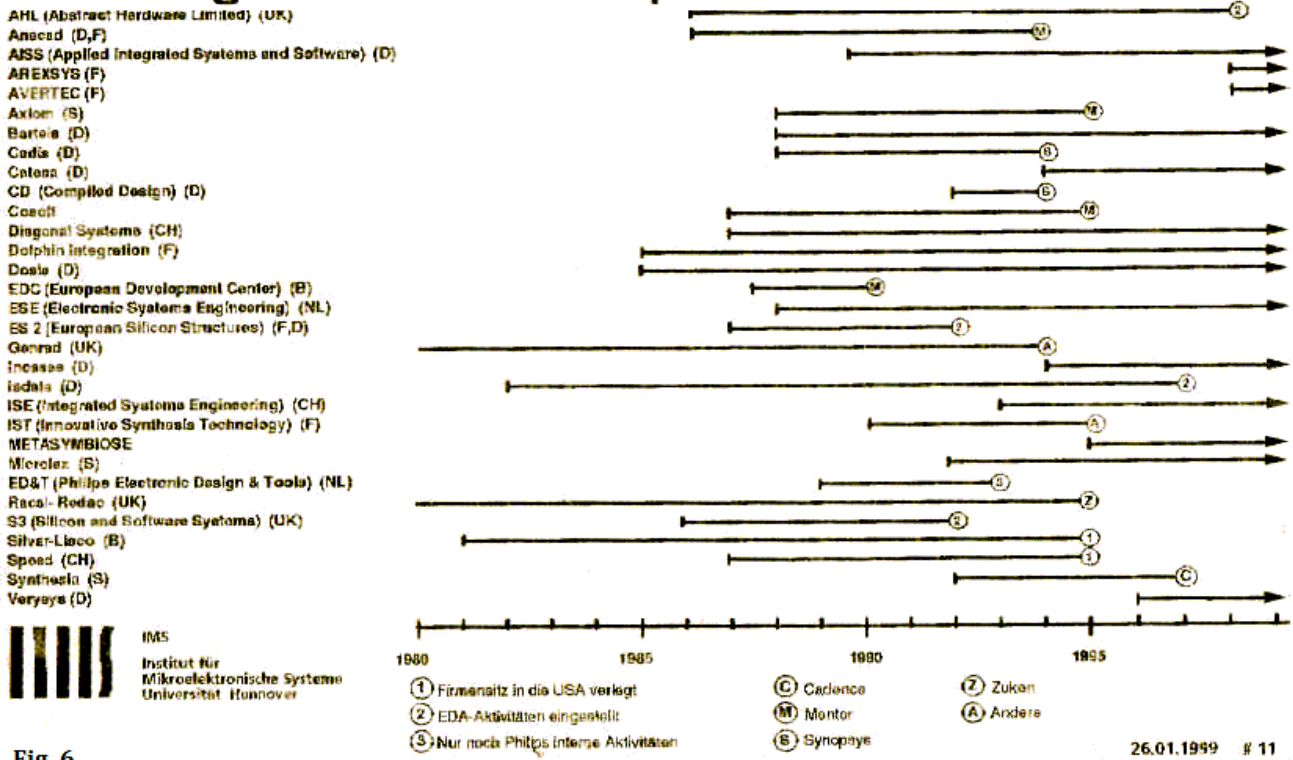

Fig. 5.

Fig. 6.

References

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